

TRANSACTIONS
OF THE
AMERICAN
FISHERIES
SOCIETY



SEPTEMBER, 1915

Published Quarterly by the American Fisheries Society
at The Aquarium, New York, N. Y.

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TRANSACTIONS
of the
American Fisheries Society

"To promote the cause of fish culture; to gather and diffuse information bearing upon its practical success, and upon all matters relating to the fisheries; to unite and encourage all interests of fish culture and the fisheries; and to treat all questions of a scientific and economic character regarding fish."

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1914-1915

Edited by The Recording Secretary

SEPTEMBER, 1915

Published Quarterly by the Society
NEW YORK, N. Y.

CERTIFICATE OF INCORPORATION OF THE AMERICAN FISHERIES SOCIETY

We, the undersigned, persons of full age and citizenship of the United States, and a majority being citizens of the District of Columbia, pursuant to and in conformity with sections 599 to 603, inclusive, of the Code of Law for the District of Columbia, enacted March 3, 1901, as amended by the Acts approved January 31 and June 30, 1902, hereby associate ourselves together as a society or body corporate and certify in writing:

1. That the name of the Society is the AMERICAN FISHERIES SOCIETY.

2. That the term for which it is organized is nine hundred and ninety-nine years.

3. That its particular business and objects are to promote the cause of fish culture; to gather and diffuse information bearing upon its practical success, and upon all matters relating to the fisheries; to unite and encourage all interests of fish culture and the fisheries; and to treat all questions of a scientific and economic character regarding fish; with power:

a. To acquire, hold and convey real estate and other property, and to establish general and special funds.

b. To hold meetings.

c. To publish and distribute documents.

d. To conduct lectures.

e. To conduct, endow, or assist investigation in any department of fishery and fish-culture science.

f. To acquire and maintain a library.

g. And, in general, to transact any business pertinent to a learned society.

4. That the affairs, funds and property of the corporation shall be in general charge of a council, consisting of the officers and the executive committee, the number of whose members for the first year shall be seventeen, all of whom shall be chosen from among the members of the Society.

Witness our hands and seals this 16th day of December, 1910.

SEYMOUR BOWER (Seal)

THEODORE GILL (Seal)

WILLIAM E. MEEHAN (Seal)

THEODORE S. PALMER (Seal)

BERTRAND H. ROBERTS (Seal)

HUGH M. SMITH (Seal)

RICHARD SYLVESTER (Seal)

Recorded April 15, 1911.

AMERICAN FISHERIES SOCIETY

Organized 1870

The first meeting of the Society occurred December 20, 1870. The organization then effected continued until February, 1872, when the second meeting was held. Since that time there has been a meeting each year, as shown below. The respective presidents were elected at the meeting, at the place, and for the period shown opposite their names, but they presided at the subsequent meeting.

PRESIDENTS, TERMS OF SERVICE, AND PLACES OF MEETING.

1. William Clift.....	1870-1872	New York, N. Y.
2. William Clift.....	1872-1873	Albany, N. Y.
3. William Clift.....	1873-1874	New York, N. Y.
4. Robert B. Roosevelt.....	1874-1875	New York, N. Y.
5. Robert B. Roosevelt.....	1875-1876	New York, N. Y.
6. Robert B. Roosevelt.....	1876-1877*	New York, N. Y.
7. Robert B. Roosevelt.....	1877-1878	New York, N. Y.
8. Robert B. Roosevelt.....	1878-1879	New York, N. Y.
9. Robert B. Roosevelt.....	1879-1880	New York, N. Y.
10. Robert B. Roosevelt.....	1880-1881	New York, N. Y.
11. Robert B. Roosevelt.....	1881-1882	New York, N. Y.
12. George Shepard Page.....	1882-1883	New York, N. Y.
13. James Benkard.....	1883-1884	New York, N. Y.
14. Theodore Lyman.....	1884-1885	Washington, D. C.
15. Marshall McDonald.....	1885-1886	Washington, D. C.
16. W. M. Hudson.....	1886-1887	Chicago, Ill.
17. William L. May.....	1887-1888	Washington, D. C.
18. John H. Bissell.....	1888-1889	Detroit, Mich.
19. Eugene G. Blackford.....	1889-1890	Philadelphia, Pa.
20. Eugene G. Blackford.....	1890-1891	Put-in Bay, Ohio.
21. James A. Henshall.....	1891-1892	Washington, D. C.
22. Herschel Whitaker.....	1892-1893	New York, N. Y.
23. Henry C. Ford.....	1893-1894	Chicago, Ill.
24. William L. May.....	1894-1895	Philadelphia, Pa.
25. L. D. Huntington.....	1895-1896	New York, N. Y.
26. Herschel Whitaker.....	1896-1897	New York, N. Y.
27. William L. May.....	1897-1898	Detroit, Mich.
28. George F. Peabody.....	1898-1899	Omaha, Neb.
29. John W. Titcomb.....	1899-1900	Niagara Falls, N. Y.
30. F. B. Dickerson.....	1900-1901	Woods Hole, Mass.
31. E. E. Bryant.....	1901-1902	Milwaukee, Wis.
32. George M. Bowers.....	1902-1903	Put-in Bay, Ohio.
33. Frank N. Clark.....	1903-1904	Woods Hole, Mass.
34. Henry T. Root.....	1904-1905	Atlantic City, N. J.
35. C. D. Joslyn.....	1905-1906	White Sulphur Spgs., W. Va.
36. E. A. Birge.....	1906-1907	Grand Rapids, Mich.
37. Hugh M. Smith.....	1907-1908	Erie, Pa.
38. Tartleton H. Bean.....	1908-1909	Washington, D. C.
39. Seymour Bower.....	1909-1910	Toledo, Ohio.
40. William E. Meehan.....	1910-1911	New York, N. Y.
41. S. F. Fullerton.....	1911-1912	St. Louis, Mo.
42. Charles H. Townsend.....	1912-1913	Denver, Colo.
43. Henry B. Ward.....	1913-1914	Boston, Mass.
44. Daniel B. Fearing.....	1914-1915	San Francisco, Calif.

*A special meeting was held at the Centennial Grounds, Philadelphia, Pa., October 6 and 7, 1876.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, ETC.,
Required by the Act of August 24, 1912, of the TRANSACTIONS OF
THE AMERICAN FISHERIES SOCIETY.

Published quarterly at New York, N. Y., April 1, 1915.

Editor, Raymond C. Osburn, The Aquarium, Battery Park, New York, N. Y.

Managing Editor, None.

Business Managers, None.

Publisher, American Fisheries Society, The Aquarium, Battery Park, N. Y.

Owners, American Fisheries Society, The Aquarium, Battery Park, New York, N. Y.

An incorporated society with about 600 active members. President, Daniel B. Fearing, Newport, R. I.; Vice-President, Jacob Reighard, Ann Arbor, Mich.; Recording Secretary, Raymond C. Osburn, The Aquarium, Battery Park, New York, N. Y. Treasurer, Chas. W. Willard, Westerly, R. I.

Known bondholders, mortgagees, and other security holders, holding 1 per cent or more of total amount of bonds, mortgages, or other securities, None.

RAYMOND C. OSBURN, *Editor*.

Sworn to and subscribed before me
this 29th day of March, 1915.

WILLIAM H. WOLFRATH, JR.,
Notary Public, No. 4081.

(My commission expires March 30, 1916.)

The American Fisheries Society

EDITORIAL

THE SAN FRANCISCO MEETING

The Forty-fifth Annual Meeting of the American Fisheries Society was held at San Francisco, Cal., on September 1-4. Although the attendance was somewhat smaller than usual the meeting was full of interest and the membership of the Society was increased by the election of three new patrons and about seventy-five new members.

Prof. Jacob Reighard, of the University of Michigan, was elected President of the Society for the year 1915-16, and Dr. Geo. W. Field, State Commissioner of Fisheries and Game for Massachusetts, Vice-President. The names of the remaining officers and the members of the various committees appear, as usual, on the back cover page.

A full account of the proceedings of the meeting will appear in a later number of the Transactions.

The next annual meeting—the forty-sixth—will be held in New Orleans, La., and the date is set for October 16 to 19, 1916.

PACIFIC FISHERIES SOCIETY

Our sister society of the Pacific Coast held the second annual meeting at San Francisco on August 9-11, 1916. An interesting meeting is reported. The following officers were elected for the coming year: President, Mr. Henry O'Malley, Oregon City, Ore.; Vice-President, Prof. Trevor Kincaid, Seattle, Wash.; Second Vice-President, Prof. Chas. L. Edwards, Los Angeles, Cal.; Secretary, Mr. John N. Cobb, Seattle, Wash.; Treasurer, Mr. Russell Palmer, Seattle Wash.; Chairman of Executive Committee, Dr. Barton W. Evermann, San Francisco, Cal.

Portland, Oregon, was selected as the next meeting place, but the date is not yet fixed.

A CORRECTION

Mr. M. L. Alexander, of New Orleans, has called the attention of the Editor to an error on page 211 of the June number of the present volume. There are, of course, no silver mines in Louisiana, and "mineral wealth" equal to \$20,000,000 annually should have been the statement. Also, instead of "six of the greatest oil fields," one should read sixth in the production of oil, although Mr. Alexander informs me that his State has now advanced to third place in this respect. The Editor takes the first opportunity to relieve Mr. Alexander of the responsibility for these misstatements. The stenographic report and the Editor's absence in Porto Rico at the time of publication are sufficient to account for the slip.

THE TILE-FISH

After an absence of many years, following the great marine catastrophe of 1882, whatever it was, that nearly destroyed the species, the Atlantic Tile-fish is again on the market in large quantities. All hail to *Lopholatilus chamæleonticeps*!

LIST OF MEMBERS, 1914--1915

Showing Year of Election to Membership

Honorary Members

The President of the United States, WOODROW WILSON.

The Governors of the several states.

Alabama, CHARLES HENDERSON.

Arizona, GEORGE W. P. HUNT.

Arkansas, GEORGE W. HAYS.

California, HIRAM W. JOHNSON.

Colorado, GEORGE A. CARLSON.

Connecticut, MARCUS A. HOLCOMB.

Delaware, CHARLES R. MILLER.

Florida, PARK M. TRAMMELL.

Georgia, JOHN M. SLATON.

Idaho, MOSES ALEXANDER.

Illinois, EDWARD F. DUNNE.

Indiana, SAMUEL M. RALSTON.

Iowa, GEORGE W. CLARKE.

Kansas, ARTHUR CAPPER.

Kentucky, JAMES B. MCCREARY.

Louisiana, LUTHER E. HALL.

Maine, OAKLEY C. CURTIS.

Maryland, PHILIP L. GOLDSBOROUGH.

Massachusetts, DAVID I. WALSH.

Michigan, WOODBRIDGE N. FERRIS.

Minnesota, W. S. HAMMOND.

Mississippi, EARL BREWER.

Missouri, ELLIOT W. MAJOR.

Montana, SAMUEL V. STEWART.

Nebraska, JOHN H. MOREHEAD.

Nevada, EMMET D. BOYLE.

New Hampshire, ROLLAND H. SPAULDING.

New Jersey, JAMES F. FIELDER.

New Mexico, WILLIAM C. McDONALD.

New York, CHARLES S. WHITMAN.

North Carolina, LOCKE CRAIG.

North Dakota, L. B. HANNA.

Ohio, FRANK B. WILLIS.

Oklahoma, R. L. WILLIAMS.

Oregon, JAMES WITHYCOMBE.

Pennsylvania, M. G. BRUMBAUGH.

Rhode Island, R. LIVINGSTON BEECKMAN.

South Carolina, RICHARD I. MANNING.

South Dakota, FRANK M. BYRNE.

Tennessee, THOMAS C. RYE.

Texas, JAMES E. FERGUSON.

Utah, WILLIAM SPRY.

Vermont, CHARLES W. GATES.

Virginia, H. C. STUART.

Washington, ERNEST LISTER.

West Virginia, HENRY D. HATFIELD.

Wisconsin, E. L. PHILIPP.

Wyoming, JOHN B. KENDRICK.

- '08 ANTIFA, PROF. DR. GREGOIRE, Inspector-General of Fisheries, Bucharest, Roumania.
- '06 BESANA, GIUSEPPE, President of the Lombardy Fisheries Society, Via Rugabello 19, Milan, Italy.
- '09 BLUE RIDGE ROD AND GUN CLUB, Harper's Ferry, W. Va.
- '93 BORODINE, NICHOLAS, 10th Linie 5, Petrograd, Russia.
- '12 CALDERWOOD, W. L., Inspector of Salmon Fisheries for Scotland, Edinburgh, Scotland.
- '04 DENBIGH, LORD, Colonel of the Honorable Artillery Company, London, England.
- '89 FISH PROTECTIVE ASSOCIATION OF EASTERN PENNSYLVANIA, 1020 Arch St., Philadelphia, Pa.
- '04 FRYER, CHARLES E., Supervising Inspector of Fisheries, Board of Agriculture and Fisheries, London, England.
- '04 HOFER, PROF. DR. BRUNO, Biological Research Station for Fisheries, Munich, Germany.
- '04 KISHINOUE, DR. K., Imperial Fisheries Bureau, Tokyo, Japan.
- '08 KITAHARA, DR. TASAKU, Imperial Fisheries Bureau, Tokyo, Japan.
- '88 LAKE ST. CLAIR SHOOTING AND FISHING CLUB, Detroit, Mich.
- '04 LAWRENCE-HAMILTON, DR. J., M. R. C. S., 30 Sussex Square, Brighton, England.
- '04 MATSUBARA, PROF. S., President Imperial Fisheries Institute, Tokyo, Japan.
- '09 NAGEL, HON. CHAS., St. Louis, Mo.
- '95 NEW YORK ASSOCIATION FOR THE PROTECTION OF FISH AND GAME, New York City.
- '08 NORDQVIST, DR. OSCAR FRITJOF, Superintendent of Fisheries, Lund, Sweden.
- '01 PECK, HON. GEORGE W., Milwaukee, Wis.
- '06 PERRIER, PROF. EDMOND, Director Museum of Natural History, Paris, France.
- '92 SOUTHSIDE SPORTSMEN'S CLUB, Oakdale, L. I., N. Y.
- '06 STEINDACHNER, PROF. DR. FRANZ, Royal Natural History, Museum, Vienna, Austria.
- '92 VINCIGUERRA, PROF. DR. DECIO, Director Royal Fish Cultural Station, Rome, Italy.
- '06 VON GRIMM, DR. OSCAR, Inspector-General of Fisheries, Petrograd, Russia.
- '08 VON KADICH, DR. HENRICH, Department of Forestry and Domain, Vienna, Austria.
- '06 VON FIRKO, FRANZ, President Austrian Fishery Society, Vienna, Austria.

Corresponding Members

- '84 APOSTOLIDES, PROF. NICOLY CHR., Athens, Greece.
'87 ARMISTEAD, J. J., Dumfries, Scotland.
'04 AYSON, CHARLES L., Hakataemen, Oamaru, New Zealand.
'04 AYSON, L. F., Commissioner of Fisheries, Wellington, New Zealand.
'09 FLEGEL, CHAS., Canea, Crete.
'08 HIGGINSON, EDUARDO, Consul for Peru, New York City.
'97 JAFFE, S., Sandfort, Lustringen, Germany.
'84 LANDMARK, A., Inspector of Norwegian Fresh-Water Fisheries, Christiania, Norway.
'84 MARSTON, R. B., Editor of the Fishing Gazette, London, England.
'09 MOHSIN, S. M., Bengal Fisheries Department, Calcutta, India.
'89 OLSEN, DR. O. T., Grimsby, England.
'08 POITEAU, CHARLNEY, Lommel, Belgium.
'84 RAVERET-WATTEL, C., Director of Aquicultural Station at Nid-de-Verdier, 20 Rue des Acacias, Paris.
'09 RIEDEL, C., Bergstedt, Germany.
'84 SABS, PROF. G. O., Christiania, Norway.
'84 SOLSKY, BARON N. DE, Director of the Imperial Agricultural Museum, Petrograd, Russia.
'10 STEAD, DAVID G., Fisheries Department, Sydney, New South Wales, Australia.
'89 TRYBOM, DR. FILIP, Stockholm, Sweden.

Patrons

- '14 ALASKA PACKERS' ASSOCIATION, San Francisco, Calif.
'15 CALIFORNIA WIRE CLOTH COMPANY, San Francisco, Cal.
'15 CHAS. F. MATTLAGE COMPANY, 335 Greenwich St., New York City.
'15 J. K. ARMSBY COMPANY, San Francisco, Cal.

Active Members *

LIFE MEMBERS INDICATED BY ASTERISK (*).

- '10 ACKLEN, JOSEPH H., Department Game, Fish and Forestry, Nashville, Tenn.
'13 ADAMS, WM. C., Commissioner of Fisheries and Game, Boston, Mass.
'01 AINSWORTH, G. G., U. S. Bureau of Fisheries, Leadville, Colo.
'10 AITCHISON, W. W., 5 Wabash Ave., Chicago, Ill.
'04 ALEXANDER, A. B., U. S. Bureau of Fisheries, Washington, D. C.
'98 ALEXANDER, GEORGE L., Grayling, Mich.
'13 ALEXANDER, M. L., Pres. Louisiana Conservation Commission, New Orleans, La.
'06 ALFORD, JABE, President State Board of Fish Commissioners, 29 W. Dayton St., Madison, Wis.
'08 ALLER, H. D., U. S. Bureau of Fisheries, Washington, D. C.
'08 ANDERSON, AUGUST J., Box 109, Marquette, Mich.
'13 ANDERSON, CARL A., U. S. Bureau of Fisheries, Manchester, Iowa.
'12 ANDERSON, FRANK, 1331 East Seventh Ave., Denver, Colo.
'92 ANDERSON, J. F., Bastad, Sweden.
'14 ANDERSON, T. T., Liggett and Myers Tobacco Co., St. Louis, Mo.
'78 ANNIN, JAMES, Caledonia, N. Y.
'14 ANNIN, HOWARD, Caledonia, N. Y.
'09 ANSLEY, H. M., New Orleans, La.
'10 ANTHONY, A. W., Ironsides, Ore.
'12 ANTOINE, CHARLES, 340 So. Wabash Ave., Chicago, Ill.
'15 ARNOLD AND WINSOR Co., 14 Boston Fish Pier, Boston, Mass.
'11 ARTHUR, S. E., 4345 Washington Ave., St. Louis, Mo.
'10 ASBURY PARK FISHING CLUB, John F. Seger, 703 Cookman Ave., Asbury Park, N. J.
'84 ATKINS, CHARLES G., U. S. Bureau of Fisheries, East Orland, Me.
'03 ATWOOD, ANTHONY, 73 Waterest St., Plymouth, Mass.
'15 ATWOOD, IRVING M., 31 Boston Fish Pier, Boston, Mass.
'10 AUGUR, W. A., 33 Fulton, St., New York City.
'10 AVERY, AMOS W., 47 Arch St., Greenwich, Conn.
'06 AVERY, CARLOS, Hutchinson, Minn.
'92 AYER, F. W., Bangor, Me.
- '01 BARCOCK, JOHN P., Provincial Fisheries' Department, Victoria, British Columbia.
'12 BARCOCK, WILLIAM H., 520 The Rookery, Chicago, Ill.
'10 BACON, CHAS. R., Chief State Bureau of Shell Fisheries, Had-donfield, N. J.
'12 BAILEY, HOWARD S., Equitable Building, Denver, Colo.
'15 BAKER, BOIES AND WATSON Co., 38 Boston Fish Pier, Boston, Mass.
'15 BALCH, HOWARD K., 158 W. Austin Ave., Chicago, Ill.
'11 BALDUS, IGNATZ, 901 Daly St., Indianapolis, Ind.
'13 BALDWIN, MARCUS D., Montana Fish and Game Commission, Kalis-pell, Mont.
'01 BALDWIN, O. N., U. S. Bureau of Fisheries, Louisville, Ky.
'98 BALL, E. M., U. S. Bureau of Fisheries, Washington, D. C.
'13 BALL, FRANK H., Grand Lake Stream, Me.
'10 BALLARD, S. THRUSTON, Louisville, Ky.

*See also appended list of names received too late to be included in this part.

- '05 BARBOUR, THOMAS, Museum of Comparative Zoology, Cambridge, Mass.
- *'12 BARNES, EARNEST W., Supt. R. I. Fisheries Experiment Station, Wickford, R. I.
- '10 BARNES, ORLANDO F., Roscommon, Mich.
- '10 BARRON, JAMES T., 1006 Yeon Bldg., Portland, Ore.
- '86 BARTLETT, DR. S. P., U. S. Bureau of Fisheries, Quincy, Ill.
- '12 BAUER, A., 25th and Dearborn Sts., Chicago, Ill.
- '14 BEAL, F. J., State Commissioner of Fisheries, Plymouth, N. H.
- '05 BEAMAN, D. C., 739 Equitable Bldg., Denver, Colo.
- '04 BEAN, BARTON A., U. S. National Museum, Washington, D. C.
- '84 BEAN, DR. TARLETON H., State Fish Culturist, Capitol, Albany, N. Y., and 1 Madison Ave., New York City.
- '01 BEEMAN, HENRY W., New Preston, Conn.
- *'13 BELDING, DAVID L., Biologist, Mass. Dept. of Fisheries and Game, Boston, Mass.
- '13 BELL, J. C., Alaska Packers' Association, San Francisco, Calif.
- '12 BELLOWES, I. H., 732 Fullerton Ave., Chicago, Ill.
- '80 BELMONT, PERRY, 580 Fifth Ave., New York City.
- *'13 BENSON, JOHN T., Director, Zoological Garden, Boston, Mass.
- '13 BENTON, A. W., M. D., 208 S. Jefferson St., Neosho, Mo.
- '13 BERG, GEORGE, Indiana Fish Commission, Indianapolis, Ind.
- '06 BERKHOUS, JERRY R., Pennsylvania Fish Commission, Torresdale, Pa.
- '13 BICKFORD, W. M., Missoula, Mont.
- '13 BICKLEY, CHAS., 56 Robbins St., Waltham, Mass.
- *'97 BIRGE, DR. E. A., State Board of Fish Commissioners, University of Wisconsin, Madison, Wis.
- '13 BLACKFORD, CHAS. MINOR, M. D., Staunton, Va.
- '13 BLAIN, JAMES, Missouri State Fish Committee, Springfield, Mo.
- '13 BLAMEY, JOHN F., Whitman, Mass.
- '01 BOARDMAN, W. H., Secretary, Board of Inland Fisheries Commissioners, State House, Providence, R. I.
- '14 BOLTON, C. C., 7016 Euclid Ave., Cleveland, Ohio.
- '12 BONFILS, FREDERICK G., *The Denver Post*, Denver, Colo.
- '02 BOOTH, DEWITT C., Spearfish, S. D.
- '11 BORCHERDT, RUDOLPH, Department of Game and Fish, Denver, Col.
- '14 BORDENKECHER, WILLIAM, R. R. 19, Haughville Station, Indianapolis, Ind.
- '90 BOWER, SEYMOUR, Superintendent Michigan Fish Commission, Detroit, Mich.
- '00 BOWER, WARD T., U. S. Bureau of Fisheries, Washington, D. C.
- '99 BOWERS, GEORGE M., Martinsburg, W. Va.
- '10 BRADLEY, GEORGE J., Minnesota Game and Fish Commission, St. Paul, Minn.
- '10 BRAMHALL, J. W., 415-417 E. 8th St., Kansas City, Mo.
- '01 BRASS, JOHN L., Michigan Fish Commission, Drayton Plains, Mich.
- '14 BRIGGS, A. B., Ashaway, R. I.
- '10 BRIGGS, DR. BENJ. M., 106 Willoughby St., Brooklyn, N. Y.
- '03 BRITTON, F. H., Vice-President and General Manager, St. Louis Southwestern Railway, St. Louis, Mo.
- *'05 BROWER, J. F., Pennsylvania Fish Commission, Holmesburg, Pa.
- '14 BROWN, ERNEST C., 52 Vanderbilt Ave., New York City.
- '14 BROWN, ERNEST CLIVE, Copake, N. Y.
- '98 BROWN, GEORGE M., care Pere Marquette R. R., Detroit, Mich.
- '04 BROWN, G. W. N., U. S. Bureau of Fisheries, Homer, Minn.
- '10 BRUCE, THOMAS H., 56 Ash St., Waltham, Mass.
- '92 BRUSH, DR. E. F., Mount Vernon, N. Y.
- '10 BRYAN, PROF. WM. ALANSON, College of Hawaii, Honolulu, H. T.

- '05 BUCK, WILLIAM O., U. S. Bureau of Fisheries, Neosho, Mo.
*04 BULLER, A. G. Pennsylvania Fish Commission, Union City, Pa.
'12 BULLER, G. W., Pleasant Mount, Pa.
*12 BULLER, NATHAN R., Pennsylvania Fish Commission, Harrisburg, Pa.
'12 BURKE, THOMAS F., Colorado Fish and Game Commission, Denver, Colo.
'07 BURNHAM, CHAS. W., U. S. Fisheries Station, Louisville, Ky.
- '11 CALDWELL, E. E., Chief Warden and Commissioner, Illinois Fish Commission, Havana, Ill.
'13 CALLAWAY, FULLER E., 207 Broad St., La Grange, Ga.
'10 CALLAWAY, W. A., care Armour & Co., Brook and Main Sts., Louisville, Ky.
'12 CAMPBELL, WALTER E., Altamosa, Colo.
'12 CAPELL, ARCH. T. P., U. S. Bureau of Fisheries, Leadville, Colo.
'02 CARTER, E. N., U. S. Bureau of Fisheries, Bullochville, Ga.
'97 CASPERSEN, BJORN, U. S. Bureau of Fisheries, Yes Bay, via Ketchikan, Alaska.
'07 CASPERSON, THORGRIM, Supt. Hetta Hatchery, Sulzer, Alaska.
*03 CASSELMAN, E. S., Lake Delaware, N. Y.
'13 CASTING CLUB DE FRANCE, Place de Concorde, Paris, France.
'07 CATTE, EUGENE, Langdon, Kan.
'13 CHAMBERS, F. W., Salt Lake City, Utah.
'03 CHANDLER, HORATIO, Kingston, Mass.
'13 CHAPMAN, L. DANA, 374 Washington St., Boston, Mass.
'06 CHEYNEY, JOHN K., Tarpon Springs, Fla.
'10 CHRISTMAN, AUGUST, 107 Bushwick Ave., Brooklyn, N. Y.
'10 CHRYSTIE, PERCIVAL, Box 186, San Diego, Calif.
'10 CHURCH, N. B., Tiverton, R. I.
'13 CHURCHILL, WINSTON, Cornish, N. H.
'05 CLARK, C. C., 316 East South Street, South Bend, Ind.
'11 CLARK, H. WALTON, U. S. Bureau of Fisheries, Fairport, Iowa.
'11 CLARK, IRA B., U. S. Bureau of Fisheries, Homer, Minn.
'10 CLARKE, ISAAC H., Treasurer Inland Fisheries Commission, Jamestown, R. I.
*11 CLEVELAND, W. B., Burton, Ohio.
'12 CLIFFORD, CHARLES P., First National Bank, Chicago, Ill.
'11 CLUB SHAWINIGAN, Club Shawinigan, St. Maurice Co., Quebec, Canada.
'00 COBB, EBEN W., Superintendent of Fisheries, Board of Game and Fish Commissioners, St. Paul, Minn.
'04 COBB, JOHN N., Pacific Fisherman, 500 Mutual Life Bldg., Seattle, Wash.
'14 COFFMAN, J. N., 4248 Cleveland, St. Louis, Mo.
'00 COGSWELL, T. M., U. S. Bureau of Fisheries, Washington, D. C.
'00 COHEN, N. H., Urbana, Ill.
'04 COKER, DR. ROBERT E., U. S. Bureau of Fisheries, Washington, D. C.
'13 COLES, RUSSELL J., Danville, Va.
'14 CONGER, GEO. C., 748 E. Market St., Akron, O.
'06 CONWAY, R. J., Director Belle Isle Aquarium, Detroit, Mich.
'01 COOPER, E. A., Cold Spring Harbor, N. Y.
*00 CORLISS, C. G., U. S. Bureau of Fisheries, Gloucester, Mass.
'10 CRAMPTON, PROF. HENRY EDWARD, American Museum of Natural History, New York City.
'14 CRAMPTON, JOHN M., State Supt., Board of Fisheries and Game, New Haven, Conn.
'13 CRANDALL, A. J., Ashaway, R. I.

- '04 and '10 CRANSON, SAMUEL E., U. S. Bureau of Fisheries, Northville, Mich.
'10 CRANSTON C. K., care First National Bank, Pendleton, Ore.
'08 CRARY, F. O., Hudson, Wis.
'11 CRASSER, HUGO, U. S. Bureau of Fisheries, Homer, Minn.
'08 CULLER, C. F., U. S. Bureau of Fisheries, Wytheville, Va.
'04 CUNNINGHAM, F. W., U. S. Bureau of Fisheries, Gloucester, Mass.
'13 CURRAN, WM. E., 3 T Wharf, Boston Mass.
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'11 ROTE, E. E., U. S. Bureau of Fisheries, Homer, Minn.
'10 ROWE, HENRY C., Groton, Conn.
'11 RUCKMAN, CHAS. W., U. S. Bureau of Fisheries, Homer, Minn.
'09 RUNION, H. P., Bankleman, Neb.
'14 RUSSELL, GEO. S., Bank of Commerce of N. A., Cleveland, O.
'13 RUSSELL, J. R., U. S. Bureau of Fisheries, Birdview, Wash.
'13 RYAN, CALVIN D., U. S. Bureau of Fisheries, Concrete, Wash.
- '13 SACHS, JAS. G., Pres. Kentucky Game and Fish Commission, 6th and Jefferson Sts., Louisville, Ky.
'05 SAFFORD, W. H., Missouri Fish Commission, St. Joseph, Mo.
'13 SANTA BARBARA PUBLIC LIBRARY, Santa Barbara, Calif.

- '12 SCHAEFFLE, ERNEST, Secretary California Fish and Game Commission, San Francisco, Cal.
- '13 SCHLEICHER, R. O., Supt. State Fish Hatchery, Story, Wyoming.
- '11 SCHMITT, WALDO, U. S. Bureau of Fisheries, Washington, D. C.
- '15 SCHOONMAKER, BYRON C., De Bruce, N. Y.
- '00 SEAGLE, GEORGE A., U. S. Bureau of Fisheries, Wytheville, Va.
- '13 SEAGRAVE, ARNOLD, Woonsocket, R. I.
- '10 SEAL, WM. P., Delair, N. J.
- '00 SELLERS, M. G., 1518 Sansom St., Philadelphia, Pa.
- '10 SHEBLEY, FRANK A., Superintendent Santa Cruz County Hatchery, Brookdale, Cal.
- '13 SHELLFORD, VICTOR E., Dept. Zool., University of Illinois, Urbana, Ill.
- '13 SHERWIN, GERALD, Windsor, Vt.
- '91 SHERWIN, H. A., 100 Canal St., Cleveland, Ohio.
- '10 SHIELDS, G. O., 1061 Simpson St., New York City.
- '11 SHINN, JAMES A., Department of Game and Fish, Denver, Colo.
- '11 SHIRA, AUSTIN F., U. S. Bureau of Fisheries, Homer, Minn.
- '08 SHIRAS, GEO., 3d; Stoneleigh Court, Washington, D. C.
- '12 SHOPE, S. P., 941 Lawrence Ave., Chicago, Ill.
- '10 SIEBEN, P. G., Director Central Swedish Fish Hatchery Co., Kloten, Sweden.
- '03 SIMMONS, WALTER C., Providence, R. I.
- '13 SINGLETON, J. ERNEST, Woonsocket, R. I.
- '01 SINGLETON, JAMES H., Woonsocket, R. I.
- *'03 SLADE, GEORGE P., 309 Broadway, P. O. Box 283, New York City.
- '13 SMITH, HERBERT C., White Cloud, Mich.
- '91 SMITH, DR. HUGH M., U. S. Commissioner of Fisheries, Washington, D. C.
- '99 SMITH, LEWIS H., Algona, Iowa.
- '14 SMITH, W. A., 750 Railway Exchange Bldg., St. Louis, Mo.
- '05 SNYDER, J. P., U. S. Bureau of Fisheries, Bozeman, Mont.
- '11 SOUTHWALL, JOHN B., U. S. Bureau of Fisheries, Fairport, Iowa.
- '12 SPARGUR, ROBERT L., Chief Clerk Colorado Fish and Game Commission, Denver, Colo.
- '08 SPEAKS, JOHN C., Chief Warden Fish and Game Commission, Columbus, Ohio.
- '12 SPENCER, F., Provo, Utah.
- '87 SPENSLEY, CALVERT, Mineral Point, Wis.
- '12 SPERRY, E. P., 126 South Euclid Ave., Oak Park, Ill.
- '10 STACK, F. GEORGE, "Kamp Kill Kare," Raquette Lake, N. Y.
- '13 STAPLETON, J. J., Green Lake, Me.
- '04 STAPLETON, M. F., U. S. Bureau of Fisheries, Manchester, Iowa.
- '00 STARR, W. J., State Board of Fish Commissioners, Eau Claire, Wis.
- '03 STEELE, G. F., Room 604, 18 E. 41st St., New York City.
- '11 STERETT, W. G., State Game, Fish and Oyster Commission, Port Lavaca, Texas.
- '03 STEVENS, ARTHUR F., 227 West Grand St., Elizabeth, N. J.
- '05 STEVENSON, CHAS. H., 511 Moffat Bldg., Detroit, Mich.
- '12 STIVERS, D. GAY, Butte Anglers Association, Butte, Mont.
- '14 STONE, DR. WILLARD J., 3 Harold Arms, Toledo, Ohio.
- '04 STORY, JOHN A., U. S. Bureau of Fisheries, Green Lake, Me.
- '04 STOTZ, MARTIN, 1132 Land Title Building, Philadelphia, Pa.
- '88 STRANAHAN, J. J., Bullochville, Ga.
- '15 STRINGHAM, EMERSON, U. S., Fisheries Laboratory, Fairport, Ia.
- '14 STRUVEN, CHAS. M., 114 S. Frederick St., Baltimore, Md.
- '14 STRYKER, THOS. H., Rome, N. Y.
- '13 SULLIVAN, WALTER E., Marquette University School of Medicine, Milwaukee, Wis.

- '04 SURBUR, THADDEUS, U. S. Bureau of Fisheries, Homer, Minn.
'11 SWIFT, H. F., Swift-Arthur Packing Co., 16 Colman Dock, Seattle, Wash.
'10 SWORD, C. B., New Westminster, British Columbia, Canada.
'10 SYLVESTER, RICHARD, Municipal Building, Washington, D. C.
- '04 TALBOT, HENRY, Interstate Commerce Commission, Washington, D. C.
'13 THAW, AUGUST B., 1421 Shelby St., Indianapolis, Ind.
'99 THAYER, W. W., U. S. Bureau of Fisheries, Northville, Mich.
'06 THOMAS, W. H., U. S. Bureau of Fisheries, Fairport, Iowa.
'13 THOMAS, ADRIAN, 2517 Hanover Ave., Richmond, Va.
'00 THOMPSON, W. P., 123 N. Fifth St., Philadelphia, Pa.
'00 THOMPSON, W. T., U. S. Bureau of Fisheries, Bozeman, Mont.
'08 THOMSON, G. H., Estes Park, Colo.
'13 TICHENOR, A. K., Secretary Alaska Packers Assn., San Francisco, Calif.
'14 TILLMAN, ROBERT T., Beacon Paper Co., St. Louis, Mo.
'13 TIMSON, WM., Vice-President, Alaska Packers Assn., San Francisco, Calif.
'10 TIERNEY, JAS. N., Roxbury, Vt.
'92 TITCOMB, JOHN W., Commissioner of Fisheries and Game, Lyndonville, Vt.
'11 TONGUE, LEONARD M., U. S. Bureau of Fisheries, Washington, D. C.
'14 TORREY, PROF. HARRY BEAL, Reed College, Portland, Ore.
'01 and '12 TOWNSEND, DR. CHARLES H., Director New York Aquarium, New York, N. Y.
'13 TREXLER, COL. HARRY C., Allentown, Pa.
'13 TRIGGS, CHAS. W., 218 N. Canal St., Chicago, Ill.
'99 TUBBS, FRANK A., U. S. Bureau of Fisheries, Mammoth Spring, Ark.
'98 TULIAN, EUGENE A., Box 1267, New Orleans, La.
'13 TURNER, CHAS. C., Judge Kentucky Court of Appeals, Frankfort, Ky.
'13 TYSON, JAS. W., Connecticut Fish and Game Commission, Hartford, Conn.
- '11 VALLETTE, LUCIANO H., Chief of Section of Fish Culture, 827 Rivadavia, Buenos Aires, Argentina.
'09 VAN ATTA, CLYDE H., U. S. Bureau of Fisheries, Leadville, Colo.
'14 VANDERGRIFF, H. D., 1728 New Hampshire Ave., Washington, D. C.
'10 VAN SICKLEN, F. W., 36 Spear St., San Francisco, Cal.
'13 VARDEN, GEO. S., Paris, Ky.
'10 VILES, BLAINE S., Inland Fish and Game Commissioner, Augusta, Me.
'11 VIKESNEY, J. H., State Game and Fish Warden, Belington, W. Va.
'14 VOGEL, J. C., 2203 Pearl St., Philadelphia, Pa.
'00 VOGELSONG, ALEXANDER T., 20 Montgomery St., San Francisco, Cal.
'12 VOGT, JAMES H., Nevada Fish Commission, Carson City, Nev.
'09 VON LEMBERKE, J., 200 Fifth Ave., New York City.
- '06 WADDELL, JOHN, Grand Rapids, Mich.
'96 WALKER, BRYANT, Detroit, Mich.
'11 WALKER, DR. H. T., 210 Main St., Denison, Texas.
'14 WALLACE, JOHN H., JR., State Game and Fish Commissioner, Montgomery, Ala.

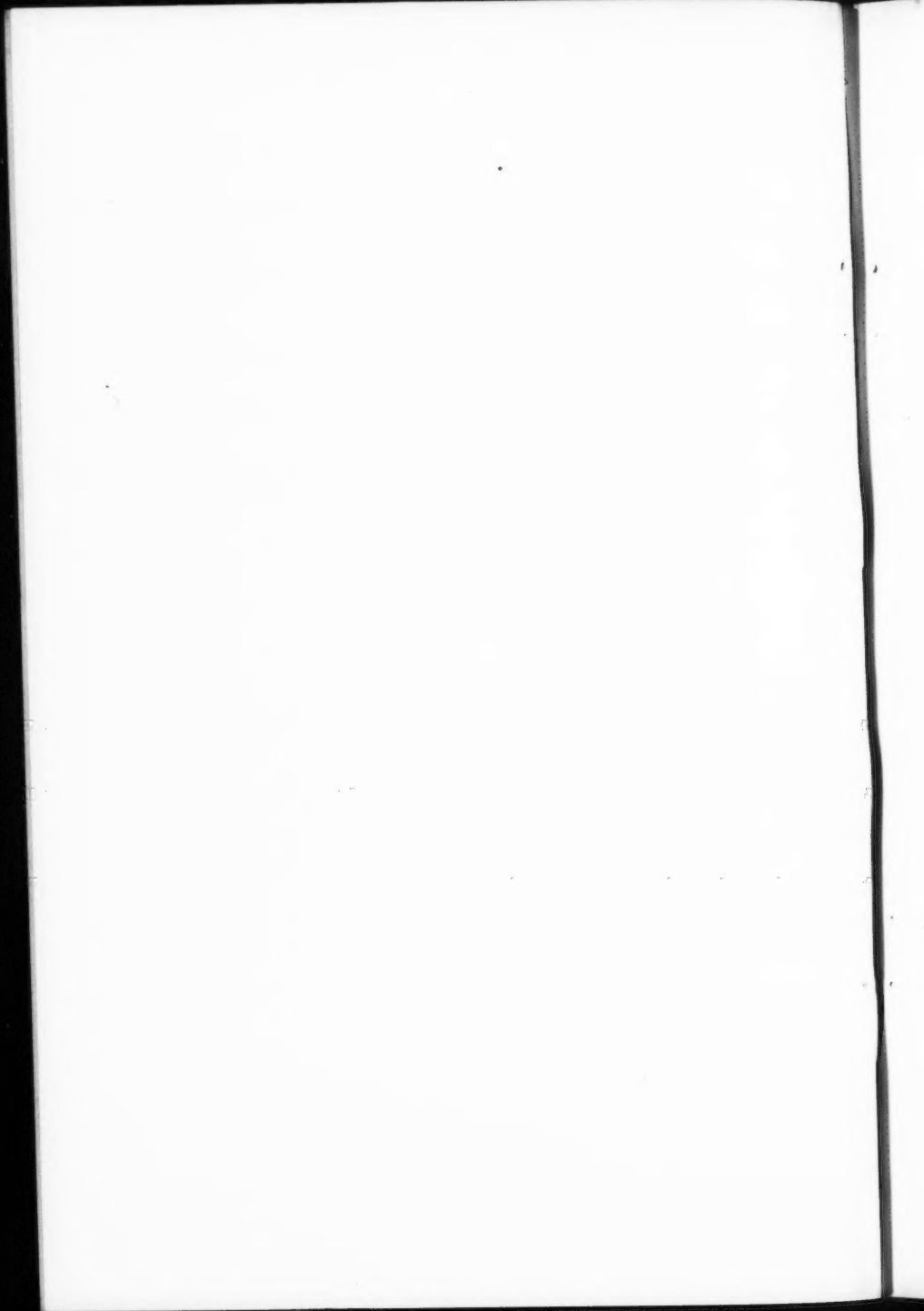
- '03 WALLICH, CLAUDIUS, U. S. Bureau of Fisheries, Concrete, Wash.
'96 WALTERS, C. H., Cold Spring Harbor, N. Y.
'98 WARD, PROF. H. B., University of Illinois, Urbana, Ill.
'12 WARD, J. QUINCY, Executive Agent, Kentucky Game and Fish Commission, Frankfort, Ky.
'14 WASHBURN, PROF. F. L., 1112 Sixth St., S. E., Minneapolis, Minn.
'13 WATTS, A. E., 9 T Wharf, Boston, Mass.
'92 WEBB, W. SEWARD, 44th St. and Vanderbilt Ave., New York City.
'12 WEBER, E. D., P. O. Box 81, Littleton, Colo.
'07 WEBSTER, B. O., Wisconsin Fish Commission, Madison, Wis.
'13 WEIL, WALTER G., Majestic Bldg., Chicago, Ill.
'15 WEIS, CAPT. JAS. E., St. Joseph, Mo.
'13 WELSH, WM. W., Scientific Assistant U. S. Bureau of Fisheries, Washington, D. C.
'15 WENNERBERG, HENRY P., 23 Boston Fish Pier, Boston, Mass.
'01 WENTWORTH, E. E., U. S. Bureau of Fisheries, Duckabush, Wash.
'13 WESTERFELD, CARL, 854 Mills Bldg., San Francisco, Cal.
'13 WESTERMANN, J. H., Harrietta, Mich.
'01 WHEELER, CHARLES STETSON, Union Trust Building, San Francisco, Cal.
'15 WHEELER, FRED. M., 546 Fulton St., Chicago, Ill.
'04 WHITAKER, ANDREW R., State Fishery Commission, Phoenixville, Pa.
'96 WHITE, R. TYSON, 320 Bridge Street, Brooklyn, N. Y.
'10 WHITMAN, EDWARD C., Canso, Nova Scotia, Canada.
'15 WHITMAN, WARD AND LEE Co., 9 Boston Fish Pier, Boston, Mass.
'15 WHITESIDE, R. B., 204 Sellwood Bldg., Duluth, Minn.
'89 WILBUR, H. O., 235 Third St., Philadelphia, Pa.
'99 WILLARD, CHARLES W., President Inland Fisheries Commission, Westerly, R. I.
'01 WILSON, C. H., Glen Falls, N. Y.
'11 WILSON, J. S. P. H., Chairman, Board of Inland Game and Fish Commissioners, Auburn, Me.
'10 WINCHESTER, GRANT E., Forest, Fish and Game Commission, Bemus Point, N. Y.
'00 WINN, DENNIS, U. S. Bureau of Fisheries, Oregon City, Ore.
'13 WINTER, J. H., Alaska Packers Assn., San Francisco, Calif.
'99 WIRES, S. P., U. S. Bureau of Fisheries, Duluth, Minn.
'13 WISNER, J. NELSON, Director, Instituto de Pesca del Uruguay, Punta del Este, Uruguay.
'05 WOLTERS, CHAS. A., Oxford and Marvine Streets, Philadelphia, Pa.
'14 WOLTERS, W. B., Wisconsin Fish Commission, Appleton, Wis.
'97 WOOD, C. C., Plymouth, Mass.
'13 WOODS, JOHN P., President, Missouri State Fish Commission, 1st and Wright Sts., St. Louis, Mo.
'14 WORK, GERALD, Perkins, Hill, Akron, O.
'11 WORTH, HENRY B., U. S. Bureau of Fisheries, Washington, D. C.
'84 WORTH, S. G., U. S. Bureau of Fisheries, Bullochville, Ga.
'10 WUEZBURG, L., Ketchikan, Alaska.
'15 WYMAN, WILLIS L., Park Rapids, Minn.

'09 YERINGTON, EDWARD B., Board of Fish Commissioners, Carson City, Nev.
'10 YOUNG, CAPT. CARL C., 2 Mt. Vernon St., Gloucester, Mass.
'06 YOUNG, CAPT. JOHN L., Atlantic City, N. J.

'99 ZALSMAN, P. G., Grayling, Mich.

Appended List of Names Recently Received

- '15 BARNES, F. C., Front St., Portland, Ore.
- '15 BITTING, DR. A. W., Nat. Canner's Assn., Washington, D. C.
- '15 BLACK, C. H., Sunny Point Packing Co., Seattle, Wash.
- '15 BOUCHER, E. C., 734 Mills Bldg., San Francisco, Cal.
- '15 BURGARD, JOHN H., Lewis Bldg., Portland, Ore.
- '15 COTTER, R. E., 112 Market St., San Francisco, Cal.
- '15 DOW, FRANK P., Tacoma, Wash.
- '15 FARISH, R. R., San Francisco, Cal.
- '15 FARRELL, R. S., 140 Front St., Portland, Ore.
- '15 FEILDING, J. B., Technical Superintendent, Dept. of Fisheries, Toronto, Ontario.
- '15 FORBES, ROBERT, Bellingham, Wash.
- '15 FREEMAN, MILLER, Seattle, Wash.
- '15 GILBERT, PROF. C. H., Stanford University, Cal.
- '15 GUNCKEL, WILL H., M. and C. Savings Bank, Toledo, O.
- '15 HARDY, W. J., 4th and Berry Sts., San Francisco, Cal.
- '15 HEROLD, R., 235 Montgomery St., San Francisco, Cal.
- '15 HOODEN, K., Montgomery, Cal.
- '15 HUNT, E. W., Sisson, Cal.
- '15 JENKINS, DR. OLIVER P., Stanford University, Cal.
- '15 JOHNSTONE, F. C., Coleman Bldg., Seattle, Wash.
- '15 KENDALL, F. P., Farling Bldg., Portland, Ore.
- '15 KENDALL, NEAL, Farling Bldg., Portland, Ore.
- '15 KIEBULFF, C. A., 2605 Fulton St., Berkeley, Cal.
- '15 KIEBULFF, T. C., Flat Iron Bldg., San Francisco, Cal.
- '15 KLEVENHUSEN, F., Altoona, Wash.
- '15 LINDENBERGER, B., Smith Bldg., Seattle, Wash.
- '15 LOWELL, MANSFIELD, San Francisco, Cal.
- '15 MADDEN, F. H., 2021 Smith Bldg., Seattle, Wash.
- '15 MATTLADGE, HENRY, 335 Greenwich St., New York City.
- '15 MINOR, R., San Francisco, Cal.
- '15 MYERS, B. D. 461 Market St., San Francisco, Cal.
- '15 SCHMIDT, CHRIS., Astoria, Wash.
- '15 SCHMIDT, MAX, 2nd and Bryant Sts., San Francisco, Cal.
- '15 SEABORN, H. G., Tee Harbor Packing Co., Port Blakely, Wash.
- '15 SHERLEY, W. H., Sisson, Cal.
- '15 SIEBE, J. F., 430 Battery, San Francisco, Cal.
- '15 STARR, C. D., Lewis Bldg., Portland, Ore.
- '15 SUTRO, ADOLPH NEWTON, 1155 Pine St., San Francisco, Cal.
- '15 THORNE, A., 738 Mills Bldg., San Francisco, Cal.
- '15 TROYER, N., Astoria Iron Works, Seattle, Wash.
- '15 WAKEFIELD, L. E., 1310 Smith Bldg., Seattle, Wash.
- '15 WEISE, ENGLEBERG, Seattle, Wash.
- '15 WELSCH, R., Bellingham, Wash.



CONSTITUTION

(As amended to date)

ARTICLE I

NAME AND OBJECT

The name of this Society shall be American Fisheries Society. Its object shall be to promote the cause of fish culture; to gather and diffuse information bearing upon its practical success, and upon all matters relating to the fisheries; the uniting and encouraging of all interests of fish culture and the fisheries, and the treatment of all questions regarding fish, of a scientific and economic character.

ARTICLE II

MEMBERS

Any person shall, upon a two-thirds vote and the payment of two dollars, become a member of this Society. In case members do not pay their fees, which shall be two dollars per year after first year, and are delinquent for two years, they shall be notified by the treasurer, and if the amount due is not paid within a month thereafter, they shall be, without further notice, dropped from the roll of membership. Any person can be made an honorary or a corresponding member upon a two-thirds vote of the members present at any regular meeting.

The President (by name) of the United States and the Governors (by name) of the several states shall be honorary members of the Society.

Any person shall, upon a two-thirds vote and the payment of twenty-five dollars, become a life member of this Society, and shall thereafter be exempt from all annual dues.

Any library, sporting or fishing club, society, firm or corporation may, upon two-thirds vote and the payment

of the regular annual fee, become a member of this Society and entitled to all its publications.

Any person, society, club, firm or corporation, on approval by the Executive Committee and on payment of \$50.00, may become a Patron of this Society with all the privileges of a life member, and then shall be listed as such in all published lists of the Society. The money thus received shall become a part of the permanent funds of the Society and the interest alone be used as the Society shall designate.

ARTICLE III

OFFICERS

The officers of this Society shall be a president and a vice-president, who shall be ineligible for election to the same office until a year after the expiration of their term; a corresponding secretary, a recording secretary, an assistant recording secretary, a treasurer, and an executive committee of seven, which, with the officers before named, shall form a council and transact such business as may be necessary when the Society is not in session—four to constitute a quorum.

In addition to the officers above named there shall be elected annually five vice-presidents who shall be in charge of the following five divisions or sections:

1. Fish culture.
2. Commercial fishing.
3. Aquatic biology and physics.
4. Angling.
5. Protection and legislation.

ARTICLE IV

MEETINGS

The regular meeting of the Society shall be held once a year, the time and place being decided upon at the previous meeting, or, in default of such action, by the executive committee.

ARTICLE V

ORDER OF BUSINESS

1. Call to order by president.
2. Roll call of members.
3. Applications for membership.
4. Reports of officers.
 - a. President.
 - b. Secretary.
 - c. Treasurer.
 - d. Vice-Presidents of Divisions.
 - e. Standing Committees.
5. Committees appointed by the president.
 - a. Committee of five on nomination of officers for ensuing year.
 - b. Committee of three on time and place of next meeting.
 - c. Auditing committee of three.
 - d. Committee of three on programme.
 - e. Committee of three on publication.
 - f. Committee of three on publicity.
6. Reading of papers and discussion of same.

(Note—in the reading of papers preference shall be given to the members present.)
7. Miscellaneous business.
8. Adjournment.

ARTICLE VI

CHANGING THE CONSTITUTION

The constitution of the Society may be amended, altered or repealed by a two-thirds vote of the members present at any regular meeting, provided at least fifteen members are present at said regular meeting.